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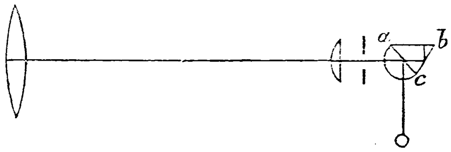
else it must be assumed that, at the average distance for stars of this magnitude, a denser stratum actually exists, succeeded possibly by regions less fruitful beyond. Having been led to the latter conclusion in opposition to preconceived ideas, I cannot but think that the enormously increased ratio with which the numbers of the telescopic stars are multiplied is deserving of increased interest and continued discussion.

Orwell Park Observatory.

A new Solar Eye-piece. By Prof. Zenger.

The Solar Eye-pieces for viewing the Sun by large telescopes were devised for the purpose of getting rid of the obnoxious glare of the solar radiation. By dark coloured glasses, absorbing fluids, reflection from polished glass surfaces, with or without the aid of polarisation of light, it was possible to view the Sun. But all these contrivances could not entirely satisfy the requirements of solar observations; either there was a much diminished field, as is the case in using Dawes's solar eye-piece, or there was a loss of definition by the use of polarising eye-pieces, or by double or triple reflection from the plane surfaces.

To obviate all these hindrances, I imagined a solar eye-piece consisting of a catadioptric lens, the last lens in the eye-piece being replaced by a hemispherical lens, with a carefully worked plane surface, inclined 45° to the optical axis of the telescope. By this replacement the field of view is scarcely affected at all, and the definition is unaltered, or even improved; for the hemispherical lens reflecting the solar rays into the eye at (O) works like a spherical lens, and the curvature may be lessened in comparison with a plano-convex lens in the ratio



$$1 : \frac{2-n}{2}, \text{ or nearly } 1 : 0{\cdot}24 = 25 : 6 = 4\frac{1}{6} : 1.$$

There is an equilateral prism placed in optical contact with the plane surface of the hemispherical lens, and denoting by n the index of refraction of the lens, and by n' that of the prism, the intensity of the reflected light by the plane surface ac will be

$$\frac{T_r^2}{T^2} = \frac{\tan^2(\alpha-\alpha')}{\tan^2(\alpha+\alpha')}.$$

The central rays falling on the lens and emerging after reflection, at the angle of 45°, by ac, will be greatly reduced in intensity if there is only a small difference in the reflecting power of the two media.

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We get

$$\sin\alpha' = \frac{\sin\alpha}{\frac{n'}{n}} = \frac{n}{n'\sqrt{2}};$$

if $n = 1{\cdot}53$, and $n' = 1{\cdot}544$, we have:—

$$\sin\alpha' = \frac{1{\cdot}53}{1{\cdot}544\sqrt{2}} = 0{\cdot}70695,$$

$$\alpha' = 44^\circ\ 28'\ 58''{\cdot}1,$$

$$\alpha - \alpha' = 0^\circ\ 31'\ 1''{\cdot}9;$$

$$\begin{aligned} \log\tan(\alpha-\alpha') &= 7{\cdot}9555421 \\ \log\tan(\alpha+\alpha') &= 12{\cdot}0730141 \\ \hline & 5{\cdot}9125280 \\ \hline 2\log\frac{\tan(\alpha-\alpha')}{\tan(\alpha+\alpha')} &= 1{\cdot}8250560 - 10, \end{aligned}$$

$$\frac{\tan^2(\alpha-\alpha')}{\tan^2(\alpha+\alpha')} = 6{\cdot}6843 \, . \, 10^{-9}.$$

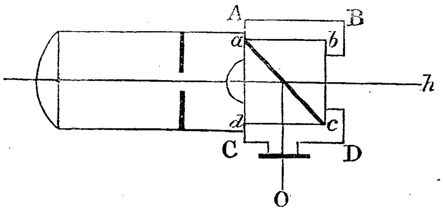
Taking the light of the full moon $= 10^{-6}$ of the solar intensity, we get

$$\frac{T_r^2}{T_{☾}^2} = 6{\cdot}6843 \, . \, 10^{-3},$$

or the intensity is diminished to 0·007 of the intensity of the full moon as viewed through the telescope.

The diminution of light is sufficient to bear the whole aperture of my four-inch refractor, or of my 4½-inch Browning with reflector, not the slightest trace of heat rays being perceptible at O, in the reflected light from the plane *ac*, but the radiation at *h* is sufficient to crack the dark glass and melt it.

It is even possible to leave the eye-pieces unaltered, and to place behind the last lens, as nearly in contact with it as possible, two equilateral reflecting prisms *abb'c*, in optical contact with each other, the hypothenuses *ac* being in optical contact. Nearly the whole radiation of light and heat is conducted to *h*, only 7×10^{-9} of it being reflected to the eye at O.



A dark chamber of blackened brass plate is placed round the double prism to get rid of the dispersed light, leaving an opening near the eye.

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Both dispositions show the Sun in a most surprising manner, free from any coloration, as an intensely white ball, bluish at the middle, and rapidly decreasing in intensity, the borders being of a greyish yellow tint. A 2½-inch Plösal Dialyse shows the same colour as the 4-inch refractor, though the secondary spectrum in the former is much more visible than in the larger telescope. I suppose this colour to be due to a diminished intensity of light, together with a yellowish ruddy coloration of the borders by the absorption of light in the deeper layer of solar atmosphere through which the light passes.

Prague, March 17, 1877.

Corrections to Struve's Double Stars contained in the Dun Echt Observatory Publications, Vol. I. By Lord Lindsay.

Mr. Burnham of Chicago, U. S. A., has most kindly sent me a list of errata and misprints which he has found in the first volume of my Observatory Publications, while reading it with the MS. of his own general Catalogue of Double Stars. As it may be of service to some of the Fellows, I venture to ask for its insertion in the *Monthly Notices*.

Corrections.

Σ			
80	Colour	*For* ash	*Read* blue
87	Mag. of A	,, 8·5	,, 8·0.
112	Decl.	,, 45° 27′	,, 45° 41′.
300	Decl.	,, 38° 55′	,, 28° 55′.
376	Position	,, 351°·22	,, 251°·22.
444	Name	,, η	,, *n*.
548	Distance	,, 141″·97	,, 14″·197.
563	Decl.	,, 10° 50′	,, 40° 50′.
544	Epoch	,, 30·72	,, 31·72.
635	Decl.	,, 50° 51′	,, 54° 51′.
733	Decl.	,, 15° 57′	,, 15° 52′.
943	Position	,, 155°·90	,, 165°·90.
977	Decl.	,, 48° 45′	,, 48° 39′.
983	Colour	,, yelsh.	,, yel.
990	Decl.	,, −14° 16′	,, −14° 6′.
1012	,,	,, 38° 20′	,, 28° 20′.
1058	,,	,, 9° 37′	,, 9° 47′ (Pos. Med.)
1062	The Decl. measures and Magnitudes all belong to Σ 1065.		
1066	Epoch	,, 39 72	,, 29·72.